Course Syllabus:

Computer Engineering MA, Wireless Access Protocols and Queuing Theory, 7.5 Credits

General data

Code	DT048A
Subject/Main field	Computer Engineering
Cycle	Second cycle
Orientation (name)	
Credits	7.5
Progressive specialisation	A1F , Second cycle, has second-cycle course/s as entry requirements
Answerable department	Department of Information and Communication Systems
Adapted	
Established	2014-06-23
Date of change	
Valid from	2014-07-01

Aim

The course aims to knowledge about models for queuing systems and how wireless access methods works and how the choice of technology can affect their performance in modern computer networks and radio communication systems.

Course objectives

The goal is that after completed course the student shall be able to:
- Describe fundamental mathematical theory for queuing systems.
- Describe different wireless access protocols that are used in real systems and present their pros and cons.
- Present fundamental theory that can be used in applied applications.
- Formulate hypotheses and theory to describe and analyze communication systems and discuss their correctness.
- Present verbally and in written form work that has been done individually or in a group.

Content

The course includes the following content:
- Queuing theory: M/M/1, M/M/1/K, M/G/1
- Wireless packet transmission: fading channels, ARQ, HARQ, energy efficient protocols, throughput/delay trade-off.
- Wireless access protocols: introduction, models och classification
- Conflict free access protocols: FDMA/TDMA system, generalizerad TDMA, dynamic conflict free access: Polling, Bluetooth.
- ALOHA protocol: Pure and slotted ALOHA, delay- and stability analyzes, effect of fading channels (errors, fading, interference), and wireless access in mobile communication system.
- CSMA protocol: Slotted/Pure CSMA, CSMA/CD, Hidden terminal, IEEE 802.11 and IEEE 802.15.4 protocol.
- Mesh-baseed networks: STDMA, multihop CSMA, routing algorithms.

Entry requirements

Computer Engineering, BA (ABC), 60 Credits, including Data Structures and Algorithms, TCP/IP Internetworking. Computer Engineering MA, Distributed System I, 7.5 Credits. Mathematics BA (AB), 30 Credits, including Discrete Mathematics and Mathematical Statistics.

Selection rules and procedures

The selectionprocess is in accordance with the Higher Education Ordinance and the local order of admission.

Teaching form

Teaching consists of lectures, seminars, hand-in exercises, practical exercises, verbally exercises and written reports.

The course can be given as a self-study course.

Examination form

6.0 Credits, T101: Written exam
Grades: A, B, C, D, E, Fx and F. A-E are passed and Fx and F are failed.

1.5 Credits, I101: Hand-in Exercises
Grades: Pass or Fail

Grading criteria for the subject can be found at
www.miun.se/en/Student/Services/Grading-Criteria.

Grading system

The grades A, B, C, D, E, Fx and F are given on the course. On this scale the grades
A through E represent pass levels, whereas Fx and F represent fail levels.

Other information

Course reading

Required literature

Author:	Dimitri Bertsekas and Robert Gallagher
Title:	Data Networks
Edition:	2nd edition
Publisher:	Prentice Hall
Comment:	ISBN 0132009161

Author:	R. Rom and M. Sidi
Title:	Multiple Access Protocols - Performance and Analysis
Publisher:	Springer-Verlag
Comment:	(Delas ut av läraren)